



## A new genus and species of myrmecophilous brentid beetle (Coleoptera: Brentidae) inhabiting the myrmecophytic epiphytes in the Bornean rainforest canopy

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### Abstract

*Pycnotarsobrentus inuiiae* Maruyama & Bartolozzi, **gen. nov.** and **sp. nov.** (Brentinae: Eremoxenini) is described from the Lambir Hills National Park, Borneo (Sarawak, Malaysia) based on specimens collected from *Crematogaster difformis* F. Smith, 1857 ant nests in the myrmecophytic epiphytic ferns *Platycerium crustacea* Copel. and *Lecanopteris ridleyi* H. Christ. A second species of *Pycnotarsobrentus* is known from Malaysia but is represented by only one female and consequently not yet described pending discovery of a male. *Pycnotarsobrentus* belongs to the tribe Eremoxenini and shares some character states with the African genus *Pericordus* Kolbe, 1883. No species of Eremoxenini with similar morphological modifications are known from the Oriental region.

**Key words:** Myrmecophily, *Crematogaster difformis*, Eremoxenini, Malaysia

### Introduction

Dipterocarp trees are the main components of tall tree flora in the Bornean lowland rainforest, and in their canopies *Crematogaster difformis* F. Smith, 1857 ants are common and dominate the arboreal ant community (Inui *et al.* 2009; Tanaka *et al.* 2009). This ant species nests mainly under the bark of trees and in the myrmecophytic epiphytic ferns *Platycerium crustacea* Copel and *Lecanopteris ridleyi* H. Christ. Current investigations of these ferns in Lambir National Park, Sarawak, revealed the presence of some obligate myrmecophilous insects. Roth (1995) described a myrmecophilous cockroach, *Pseudoanaplectinia yumotoi*, based on material collected by Dr. Takakazu Yumoto. Maruyama (2010) described a myrmecophilous scarab beetle, *Pterobius itiokai*, which was collected by Dr. Takao Itioka. Both taxa are unique to the nests of *C. difformis*. In September 2011, we (Japanese authors) intensively investigated the ferns inhabited by *C. difformis* in Lambir Hills National Park. This resulted in the discovery of additional myrmecophiles. One of them, a brentid beetle of the tribe Eremoxenini, was the most outstanding discovery, because no species of that tribe with similar morphological modifications were known from the Oriental region. Although it is similar to the African genus *Pericordus* Kolbe, 1883, it shows some unique character states. This paper describes it as a new genus and species.

## Materials and methods

Materials are deposited in the following institutions:

DFS	Forest Department of Sarawak, Malaysia
KUM	M. Maruyama Collection at The Kyushu University Museum, Fukuoka, Japan
MZUF	Museum of Natural History of the University of Florence, Italy

Photographs were taken by Canon 60D camera with Canon MP-E65 macro lens and mounted by using the software CombineZM.

### *Pycnotarsobrentus Maruyama & Bartolozzi, gen. nov.*

**Type species.** *Pycnotarsobrentus inuiiae* Maruyama & Bartolozzi, **sp. nov.**, by present designation.

**Description. Male.** Body (Figs. 1, 2) rather short, stout.

Head (Fig. 3) short, twice as wide as long, slightly convex above; eyes large, strongly prominent and hemispherical, occupying almost entire side of head, their posterior margins contiguous with basal constriction; antennae (Fig. 3) 11-segmented, short, thick, cylindrical, slightly widened apically, almost symmetrical, apical segment rounded distally, not pointed; rostrum longer than wide, not separated from head by any depression, tubercle or carina; metarostrum short, margined laterally, concave at sides; mesorostrum roundly convex at sides, slightly depressed dorsally, without medial carina; prorostrum much narrower than mesorostrum, slightly depressed at sides, margined laterally, concave at sides, truncate at apex; mandibles short; rostral apophyses slightly expanded laterad; underside of pro- and mesorostrum flattened, dilated apicad.

Pronotum (Fig. 1) longer than wide, strongly punctured at sides, slightly on disc, with trace of median sulcus basally.

Elytra (Fig. 1) slightly wider than pronotum, parallel-sided in basal half, narrowed toward apex, slightly flattened and expanded at apex, striae narrow, interstriae wider; underside of apical expansions with trichomes along border.

Legs (Figs. 1, 2) robust, femora laterally compressed from base to middle; tibiae (Fig. 4) laterally compressed with weak swelling in middle, serrate on inner margin; hind and mid tibiae with inner margin tooth-shaped at apex; minute tibial spurs 1-2-2; tarsi short, thick, compressed, parallel-sided; tarsal segment III with pair of longitudinal adhesive patches of pubescence; tarsal segment IV shorter than III.

Prosternum linear between coxae. Metasternum with medial longitudinal groove. Sternites III-IV with large medial circular depression; sternite VII slightly emarginate at apex.

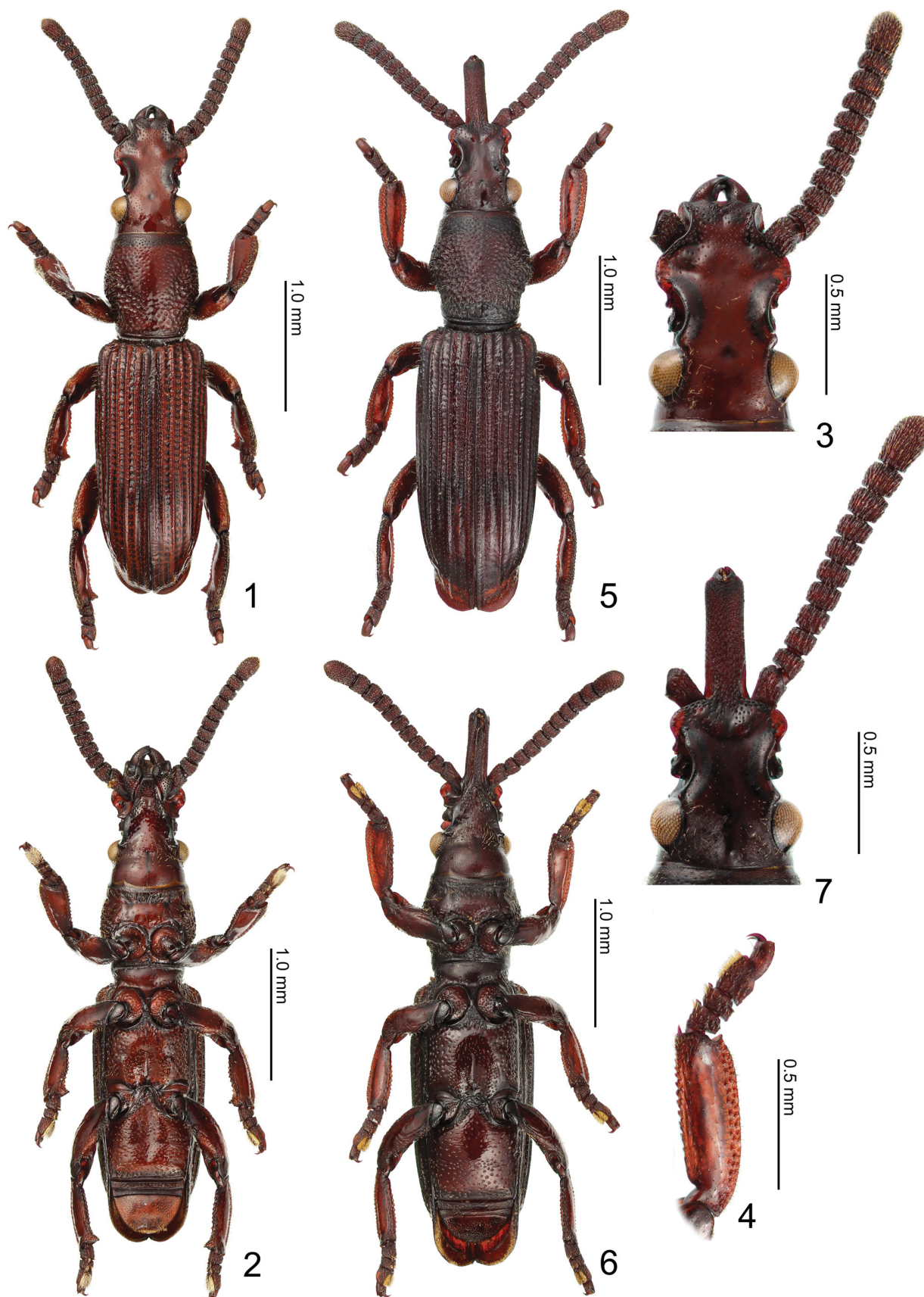
**Female.** Body (Figs. 5–6) similar to male. Antennae (Fig. 7) slightly longer than in male; mesorostrum slightly shorter, less expanded laterad; prorostrum short, cylindrical, slightly narrowed towards apex. Mid and hind tibiae (Figs. 5–6) without inner apical tooth-like expansion. Metaventrite slightly depressed around middle. Sternites III-IV completely fused, without medial depression.

**Differential diagnosis.** This genus is close to the African genus *Pericordus* Kolbe, 1883, in the head and rostrum lacking depression or carinae, short antennae, laterally compressed femora and tibiae, and rather thick and short tarsi, but clearly distinguished from it by the antennal segments being cylindrical, rugose and rather compressed, with the apical segment rounded at apex, by the mesorostrum being not convex, by the tarsi being shorter, with parallel-sided segments and extremely short tarsal segment IV.

**Etymology.** The generic name is derived from Greek words meaning “stout tarsi-bearing brentid” for one its important character states: the thick, short tarsi. Gender masculine.

### *Pycnotarsobrentus inuiiae* Maruyama & Bartolozzi, **sp. nov.**

**Type material.** Holotype, ♂ (DFS), Lambir Hills National Park, Sarawak, E. Malaysia, 22 IX 2011, Itioka et al. leg. Paratypes, 3♂ (KUM), same data, but 28 IX 2011; 1♂ (MZUF, collection number 17085), 1♀ (DFS), same data but 17 IX 2005 (ex T. Itioka collection). All the specimens were collected from nests of *Crematogaster difformis* in domatia of the canopy ferns.



**FIGURES 1–7.** *Pycnotarsobrentus inuiiae* **gen. nov. and sp. nov.** 1—Male habitus, dorsal view (paratype; color became paler during preserving in ethanol), 2—same individual, ventral view, 3—ditto, head, dorsal view, 4—right fore tibia and tarsus, 5—female habitus, dorsal view (paratype), 6—same individual, ventral view, 7—ditto, head, dorsal view.





**FIGURES 8–10.** Habitat of *Pycnotarsobrentus inuiiae* gen. nov. and sp. nov. 8—*Platycterium crustacea* Copel., 9—*Lecanopteris ridleyi* H. Christ., 10, 11—living male in a domatia of *Lecanopteris* sp.

**Description. Male.** Body (Figs. 1, 2) dark brown, with legs slightly lighter.

Head (Fig. 3) short, eyes totally occupying its lateral sides until basal constriction; vertex connected to mesorostral plate on same plane; surface of vertex with sparse yellow minute setae; metarostrum about as long as head, laterally concave; lateral apophysis preceded by minute tooth; mesorostrum large, flat, laterally rounded; prorostrum short, almost parallel sided; lateral margins of mesorostrum and prorostrum moderately punctuate; underside of meta- and mesorostrum moderately covered with setiferous punctures; antennal segments cylindrical, rather compressed, with rugose surface; segments II–X of antennae all wider than long; segment XI twice as long as wide.

Pronotum (Fig. 1) 1.1× as long as wide, with similar width at anterior and posterior margins, widest at middle; finely punctured on disc, strongly rugose at sides, with some scattered erect golden setae.

Elytra (Fig. 1) 2.4× as long as pronotum; all striae and interstriae present; humeral calli slightly prominent; interstriae 3 and 5 slightly elevated; surface with sparse suberect small setae, denser at sides.

Legs (Figs. 1, 2) with femora weakly dilated from base to apex, laterally compressed basally, then weakly swollen; tibiae (Fig. 4) with inner margin almost straight, serrate; outer margin gently curved; surface smooth but along outer margin with granulate setiferous punctures; tarsi short, segment I slightly longer than II, segment III

about twice as long as II, deeply hollowed at apex, last tarsal segment very short, its basal part deeply inside hollow of segment III, surface of segments I-III rugose; underside of segment III with two longitudinal hairy pads.

**Female.** Body (Figs. 5, 6) more matte, densely micro-reticulate overall. Prorostum cylindrical, densely and coarsely punctured, punctation denser but smaller than on mesorostum. Pronotum more coarsely punctured, except along anterior margin. Elytra more densely punctured.

Body length : 8.5–6.2 mm (including rostrum).

**Differential diagnosis.** No species of Eremoxenini with similar morphological modifications are known from the Oriental region and the new taxon is easily distinguishable from all other Asian Eremoxenini by the generic diagnosis.

**Etymology.** Dedicated to Dr. Yoko Inui, one of the collectors, for her invaluable contribution to the knowledge of tree canopy ant communities.

**Bionomics.** The beetles were found exclusively inside the nests of *C. difformis* in the domatia of the epiphytic ferns (Figs. 8, 9). They were observed to walk slowly when the nests were excavated (Fig. 10, 11), and the ants did not pay any attention to them. Ecological studies on the communities of the myrmecophiles in the nests of *C. difformis* are in progress by the Japanese authors.

### *Pycnotarsobrentus* sp.

**Specimen examined.** 1 ♀, near Keningau, Sabah, Malaysia, IV 2005 (KUM).

**Comments.** This female specimen apparently belongs to *Pycnotarsobrentus*, and can be distinguished from *P. inuiiae* by the presence of a pair of furrows near the apices of the elytra. This is an undescribed species, but description will be delayed until a male specimen becomes available. The specimen is thought to have been collected at a light trap by a local insect collector.

### Systematic position of the new taxon

The new genus is similar to the African eremoxenine genus *Pericordus* in having the vertex of the head connected to the mesorostral plate in the same plane, without depressions, the laterally compressed tibiae, and shortened tarsi. However, in *Pericordus*, the underside of mesorostrum is strongly convex and deeply furrowed medially (thus forming a pair of tubercles) and sternites III and IV are not fused. The antenna and the tarsi are also different from those of *Pericordus* in the new genus. These differences are large enough to discriminate the two genera, and suggest a convergence in the shared characters. *Pycnotarsobrentus* belongs to the *Symmorphocerus-Cordus* group of Damoiseau (1979) and can be included in the key given in Damoiseau (1980) at couplet 3 as follows:

- |     |   |   |
|-----|---|---|
| 3.  | Antennal segments large and flattened, 3 times larger than length at funicle .....            | 4   |
| -.  | Antennal segments less flattened, never more than 3 times larger than length at funicle. .... | 3a  |
| 3a. | Last tarsal segment longer than tarsomere III; last antennal segment pointed at apex .....    | <i>Pericordus</i>                         |
| -.  | Last tarsal segment shorter than tarsomere III; last antennal segment rounded at apex .....   | <i>Pycnotarsobrentus</i> <b>gen. nov.</b> |

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